

REMARKS

The present invention is an antenna and a mobile phone including an antenna. An antenna in accordance with an embodiment of the invention comprises an element as defined in paragraph [0005] of the Substitute Specification. An example of the element is illustrated in Fig. 3. The element is formed from conductor patterns 42 on a plurality of the layers including at least one buried layer of a multilayer PCB 40. The conductor patterns are in a stacked relation and may be interconnected through the PCB by vias 52.

Claims 5-8 stand rejected under 35 U.S.C. §112 as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Claims 5 and corresponding claims 13, 21 and 29, which the Examiner did not reject on grounds of indefiniteness, have been amended to overcome the stated grounds of rejection.

Claims 1-4 and 9-12 stand rejected under 35 U.S.C. §102 as being anticipated by United States Patent 4,860,019 (Jiang et al). The Examiner reasons as follows:

Regarding Claims 1-4, Jiang et al. show in Figures 1a-c, an antenna comprising an element and formed from conductor patterns on a plurality of layers (top and bottom surfaces) of a multilayer PCB (two surfaces) and the patterns are in stacked relation and interconnected (via AE and BD), and portions of the element are located at the edge 21 of the PCB at 2,2',7,7', and the PCB is apertured 12 (Figures 3a,b,4a,b) adjacent the element. The vias CF, AE and BD are also considered apertured. Regarding Claims 9-12, the ground plane portions are shown as 8,9 (Fig. 1c, connected with vias FC, AE, etc.

These grounds of rejection are traversed for the following reasons.

Independent claim 1 recites:

An antenna comprising:
an element; and wherein
the element is formed from conductor patterns on a plurality of
layers including at least one buried layer of a multilayer PCB, and the
conductor patterns are in stacked relation and interconnected through
the PCB.

and Independent claim 17 recites:

A mobile phone including an antenna comprising an element
formed from conductor patterns on a plurality of layers including at
least one buried layer of a multilayer PCB, wherein the conductor
patterns are in stacked relation and interconnected through the PCB.

Each of independent claims 1 and 17 recite substantively an element "formed from conductor patterns on a plurality of layers including at least one buried layer of a multilayer PCB, wherein the conductor patterns are in stacked relation and interconnected through the PCB." This subject matter is not disclosed by Jiang et al.

First, a multilayer PCB is understood by persons of ordinary skill in the art to include buried conductor layers as illustrated in Fig. 3. Moreover, claims 1 and 17 recite at least one buried layer. The applicant will supply a prior art publication demonstrating what a multilayer PCB is understood to be by a person of ordinary skill in the art to include at least one buried layer if the Examiner questions the above assertion.

Jiang et al disclose what is known in the art as a double sided PCB which has a single substrate and two conductor layers disposed on opposed sides. Jiang et al do not have any buried layers. In this regard, the Examiner is referred to column 5, lines 3-8, wherein the Jiang et al material substrate is clearly described as "a sheet of an electrically non-conductive synthetic

plastic material covered and superimposed by copper or aluminum foils on the two opposite sides". Therefore, Jiang et al do not disclose the claimed multilayer PCB including at least one buried layer and conductor patterns on the plurality of layers.

Moreover, claims 1 and 17 recite the plurality of layers including at last one buried layer which are "interconnected through the PCB". The Examiner is referred to Fig. 6 of Jiang et al where rivets 24 and 26 are clearly described as interconnecting the terminals A and E and B and D which, as seen from Figs. 1-4, are not part of conductor patterns of an element as defined in the specification. Instead, the terminals A-D are connected to the serpentine strip lines which are feed circuits and not part of the claimed antenna element as defined in the specification. Accordingly, it is submitted that the subject matter of claims 1-4 and 9-12 is not anticipated by Jiang et al.

Dependent claims 3, 4, 11 and 12 limit claims 1 and 2 and 10 and 11 respectively in reciting that the PCB is apertured adjacent to the element. As has been pointed out above, Jiang et al do not disclose a multilayer PCB including at least one buried layer.

Claim 9 further limits claim 1 in reciting "an antenna ground plane comprising a plurality of vias connecting ground plane regions on respective PCB layers." The Examiner has construed the structures 8 and 9 as illustrated in Figs. 1c, Fig. 2b, Fig. 3b and Fig. 4b to be the ground plane. These structures are described as strip lines which do not constitute ground planes. A ground plane is not the strip line of Jiang et al. In this regard, the Examiner is referred to paragraph [0025] in the Substitute Specification

wherein the layers 40a-40h are described as having respective ground plane layers 41a-41h which are ground planes. The rejection of claims 19, 20, 27 and 28 is traversed for the same reasons as set forth with respect to claim 3, 4, 11 and 12.

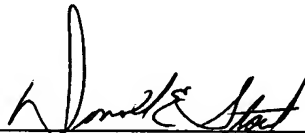
Claim 25 is patentable for the same reasons set forth above with respect to claim 9 regarding the claimed ground plane comprising a plurality of vias connecting ground plane regions on respective PCB layers which are not disclosed by Jiang et al for the reasons set forth above.

In view of the foregoing amendments and remarks, it is submitted that the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (1076.41311X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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Attachments

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